

**Sidewalk Master Plan
City of Sierra Madre
Public Works Department
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Introduction

Goals of the Sidewalk Master Plan

The Sierra Madre Sidewalk Master Plan is intended to be a broad planning document that can be referenced when sidewalk considerations confront the Public Works Department. Resources and funding will most likely prevent the city from accomplishing all recommendations of this plan immediately. The primary goal of this plan is continuous improvements towards a safe, accessible, useful, aesthetically pleasing and sustainable system of walkways throughout the city.

Purpose of Sidewalk Master Plan

This Sidewalk Master Plan:

- Inventories all existing standard and non-standard sidewalks in the city.
- Inventories all street segments with no sidewalk or with discontinuous sections of sidewalk.
- Identifies opportunities and constraints for future sidewalk considerations.
- Recommends changes and additions to existing programs, policies, and municipal codes.
- Builds upon existing prioritization criteria for sidewalk repair and installation.
- Identifies potential funding sources for sidewalk repair and construction.

Why the City Repairs Damaged Sidewalks

At a time when so many community needs compete for limited funding and manpower resources, when so many components of the city's infrastructure are in need of repair, why should the repair of city sidewalks be a high priority?

Sidewalks are the pedestrian arteries of the city and the safety of those pedestrians using the sidewalks is a significant concern to the community. As is the case with any other segment of city-owned infrastructure, the city is generally considered to be responsible for the safety of persons using the sidewalks.

A sidewalk inspection program paired with a plan for maintenance and installation provides economic benefits to the city by preventing claims and minimizing the expense of litigation. Aside from the prevention of accidents, inspection programs and maintenance/installation plans may allow cities to take advantage of certain governmental immunities that are not otherwise available to those entities without such programs.

Government Code Section 835.4(b) states: "A public entity is not liable under subdivision (b) of Section 835 for injury caused by a dangerous condition of its property if the public entity establishes that the action it took to protect against the risk of injury created by the condition or its failure to take such action was reasonable."

The city has received six trip and fall claims since fiscal year 2003-2004. Of those six, four resulted in settlements with the claimants ranging from \$46,000.00 to \$254,000.00. Since 2009 alone, the city's insurance authority has settled a total of \$97,000.00 to sidewalk defect claims.

Causes of Sidewalk Damage

Concrete sidewalks can be damaged by a number of factors. Some of them, such as heaving due to frost or expansive soils are not applicable in Sierra Madre.

The most common factor causing sidewalk damage in Sierra Madre is the growth of tree roots in parkways or on adjoining private properties. In addition, there are locations where the trunk flare of trees have displaced sidewalks vertically and/or horizontally.

- The causes of root damage vary from shallow and surface roots in contact with the sidewalk to the radial growth increase of deeper roots causing sidewalk displacement. (figure 1) Sometimes the offending shallow or surface roots may be pruned. Relocating, narrowing, or modifying the sidewalk materials may reduce the need to root-prune.



Figure 1 Displacement caused by roots.

- The cause of trunk flare damage is a lack of space. This is commonly referred to as “Wrong Tree, Wrong Space”. The sidewalk is actually in contact with and lifted or offset by the enlarging tree trunk. Increasing the distance between the tree and sidewalk is the optimum way to correct this situation while retaining the tree. There are no opportunities to root-prune in this situation and put the sidewalk back in the same location. If the decision is to remove the tree the same damage can be expected in the future unless the site design is modified or a much smaller species of tree is planted. (figure 2)

It is important to keep in mind that sidewalks must be located in the public right-of-way. Routing a sidewalk around a tree should not include any consideration of moving it onto private property, as doing so would necessitate the City obtaining an easement on the private property for the installation of the sidewalk. Creation and recordation of an easement for sidewalk purposes will be costly and will require the cooperation of the property owner.



Figure 2 Displacement caused by trunk.

Other factors causing damage to sidewalks in Sierra Madre include scraping damage from the undercarriage of low slung vehicles or crushing damage caused by operation of heavy vehicles across sidewalks.

A Word on Trees

The city's concern for public safety is measured along with its concern for the health of its trees. The City of Sierra Madre values its Community Forest, as evidenced by its long-standing Tree Preservation Ordinance and formation of the Tree Advisory Commission and its transition to the Energy, Environment & Natural Resource Commission. Trees are a valuable component of the urban infrastructure which provides many benefits to people. Larger trees provide greater benefits than small trees. Removing and replacing a large tree with a small tree to enable durable sidewalk repair will maintain the quantity of trees in the community forest, but not the level of tree benefits. Therefore, whenever possible, Public Works personnel should try to retain the existing larger trees while making a repair or create better space for larger trees in the future.

Trees need to be healthy and have a thriving root system. The mature size of the tree needs to be considered when a tree is planted because it will grow much larger than the nursery stock

size. The size and depth of the root system also needs to be considered. New construction materials and site re-design can provide ample space for the two infrastructure elements (tree and sidewalk) to co-exist. However, existing retrofit sites may not have the necessary space to allow for re-design that could increase the distance between tree trunk, roots and the sidewalk. This Plan examines a range of options for replacing damaged sidewalks while either retaining the existing tree, or improving the site design for the next tree.

No “One-Size-Fits-All”

As opposed to a planned community where all components are included in a single, consistent design, Sierra Madre has evolved over a long period of time with great variety in its housing and commercial stock as well as its infrastructure. The many different examples of housing designs, neighborhoods, and environments contribute to the unique and charming village atmosphere that defines the City of Sierra Madre. This carries over to infrastructure design as well. This Plan will not be able to provide universal specifications for each challenge. Rather it will attempt to provide city staff with a palette of options and provide options to consider to face the many unique challenges of improving and maintaining the city’s sidewalks.

Chapter 1 - Existing Policies, Programs, and Plans

City of Sierra Madre – Department of Public Works Sidewalk Inspection Program

Developed in March of 2012, the City of Sierra Madre Department of Public Works Sidewalk Inspection Program (**Appendix A**) provides standard instructions for conducting sidewalk inspections and the management of records. The program also provides a 4-tiered rating system for sidewalk defects beginning with a baseline of $\frac{3}{4}$ inch displacement. The program provides for a number of sidewalk repair options, but is primarily focused on inspection and records management.

Staff estimates that approximately 48 man hours are required to conduct the inspections throughout the city.

This program has been used by Public Works Crews for the last 2 $\frac{1}{2}$ years and has provided a method of using field logs during inspections, and then the manual entry of inspection results into an Excel database. (**Appendix B**) The current Sidewalk Inspection shows a total of 610 locations in the city that need repair. Of the 610 locations, 281 repairs have been made as of the end of calendar year 2014. Many of these repairs were made to the highest priority locations and done with asphalt patching (figure 3) or concrete grinding to eliminate immediate hazards.



Figure 3 - Asphalt patching

At the beginning of 2011, a city-wide software upgrade was procured and a key component of the new software was a project-tracking system known as InCode. The use of InCode for sidewalk issues predates the Inspection Program by approximately half a year. The software project tracking has essentially been maintained parallel to the manual inspection and data entry. However, the InCode record keeping indicates a total of 430 locations identified for repair and 124 repairs made.

Staff is recommending that these two methods of inventorying sidewalk issues and repairs be combined to reduce redundancy and improve accuracy. Specific recommendations can be found in Chapter 4 – Action Plan.

Outdoor Dining

Providing tables and seating along the sidewalk adjacent to restaurants in the downtown section of the city has grown to be very popular. There are currently 16 active permits for outdoor dining. These permits are renewed every year, and applicants are required to provide proof of insurance and sidewalk site plans with their request. The permit requires a 5 foot continuous walkway to be maintained for pedestrian use. Tables and chairs are required to be removed at the end of each business day, and the permit also requires umbrella vertical clearance specifications and sidewalk cleaning requirements.



Figure 4- Outdoor dining on N. Baldwin Ave.

Americans with Disabilities Act

The American with Disabilities Act (ADA) is an extensive and thorough list of requirements designed to allow for people with disabilities safe access in many aspects of their daily life. Sierra Madre's Joint Powers Insurance Authority (JPIA) has provided compliance strategies to meet these requirements and reduce the risk of litigation. As far as the ADA requirements pertaining to sidewalks, the primary concerns are:

- 4 foot minimum width
- Vertical displacement of $\frac{3}{4}$ inch or less
- Slope of 5:1 or less
- Adequate vertical and horizontal clearances
- Ramping at crosswalks
- Driveway approach/sidewalk transition

These six primary concerns do represent a challenge to a number of sidewalk sites in the community. Below are images that provide examples (in Sierra Madre) where the requirements are not being met, and many of the images demonstrate the difficulties staff has as they seek methods to come into compliance.

Figure 5 below shows Windsor Lane, looking north from W. Sierra Madre Blvd. The challenge at this location is the 4-foot minimum width requirement. This narrow sidewalk exists on both the east and west side of the street, and both sidewalks have structural walls on their sides. The only feasible project to come into compliance at this location would most likely include making this a one-way street and widening one or both of the sidewalks.



Figure 5 – Windsor Lane

The most common challenge is the displacement of $\frac{3}{4}$ inch or greater. As previously mentioned, our inspection data shows 610 identified sites for repair. The majority of these sites are concerned with displacement. Our data shows that of those 610 identified repair sites, 281 have had temporary repairs made. Figure 6 below shows a displacement of over an inch; this is an example of a high priority location that would be addressed quickly. (It was repaired shortly after the picture was taken.)



Figure 6 - High priority displacement site

Sloping issues are also a concern with an eye for ADA compliance. In figure 7 below, the location was raised considerably by tree roots, and then asphalt repairs also add to slope concerns. This location is close to, if not exceeding, the 5:1 slope ratio.



Figure 7 - Slope concern

While vertical and horizontal clearance is less of an issue within our sidewalk system, these concerns exist and must be addressed. If the clearance problem is due to relatively small branches, the correction can be done rather easily, however, the branches may grow back and the lack of clearance can become an ongoing issue. In figure 8 below, there is an example of a more challenging horizontal clearance issue.



Figure 8 - Horizontal clearance issue.

Ramping at intersections is required to be done when sidewalk repair occurs at these locations. Fortunately, Sierra Madre has “chipped away” at upgrades for these locations at a good pace. In 2014, with funding in the amount of approximately \$45,000.00 from a Community Development Block Grant (CDBG), 22 new ramps were installed. Figure 9 is one of the locations that had a ramp installed in the past month. All intersections now have ramps.



Figure 9 - Recent ramp installation.

The sixth primary concern can be considered as maintaining the consistency of a sidewalk that is designed to provide safe access for differently-abled pedestrians. On Sturtevant Drive, which is basically the only sidewalk in the Canyon areas, the sidewalk is very inconsistent. This is due to the varied styles of sidewalk and driveway approach interaction.

Along this sidewalk, there are sloped driveway approach transitions along with “curbed” transitions. This is also representative of a situation in which there is no “one-size-fits-all” remedy. The topography surrounding the sidewalk presents unique challenges as the private driveway is on a much lower grade than the street and makes this transition difficult.



Figure 10 - Looking east on Sturtevant Drive.

The California Streets and Highways Code Section 5610-5618

Aside from the Sidewalk Partnership Program discussed below, the City of Sierra Madre has historically been financially responsible for the installation and maintenance of the sidewalks. However, there are some cities in California that put that responsibility on the adjacent landowner. Staff conducted a survey (**Appendix C**) in 2010 to get a feel of how common landowner responsibility for sidewalk maintenance is across California. The survey shows that, while it is still more common for a city to have this responsibility, there are a significant number of responding California cities that have cited the California Streets and Highways Code Section 5610-5618 (**Appendix D**) to place the burden on the property owners.

General Plan

The City of Sierra Madre is currently updating its General Plan. The most recent update of the General Plan occurred in 1996, and the update is anticipated to be completed early in 2015. There is not much specific direction in the 1996 Plan or the updated draft portions that are currently being discussed in relation to sidewalk management. However, one item has been suggested in the update that recommends improving “sidewalk continuity”. The General Plan is expected to identify pedestrian safety as a broad and general recommendation this Sidewalk Master Plan should be useful in implementing the general goals developed in the new General Plan.

Community Forest Management Plan

Sierra Madre completed the Community Forest Management Plan in March of 2014. This is a robust Plan that addresses a large number of topics that affect our Community Forest from a “30,000 foot level” as well providing specific details about site inspections and tree evaluations that address tree/sidewalk interaction. Appendix I of the Plan specifically addresses off-site improvements (sidewalks, curbs, gutters, drains, asphalt paving and other improvements).

- Off-site improvements in conjunction with construction projects should consider replacing concrete sidewalks with alternative sidewalk materials that can have secondary benefits through the reduction of urban runoff.
- Place a sheet of six mil or thicker plastic over the grade within affected portions of tree protection areas prior to pouring concrete sidewalks, curbs, inlets, ramps and driveway approaches. The plastic will assist in providing a non-leaching barrier between the concrete, soil and roots.
- Limit grading to a maximum of two inches of fill over natural grade within critical root zones. Fill should consist of sandy loam topsoil. Clay soils should not be used as fill. When using fill soil, the existing surface to receive fill should be scarified or roughened prior to filling. Any filling operation should not occur during water saturated soil conditions.
- Alternative base course materials may be used upon approval from the city. Engineered structural soil mix is an alternative for hardscape near trees.

- Masonite type forms are preferred for curb and gutter construction because they minimize excavation. This method should be used in the Critical Root Zone. Where appropriate, use curbs with discontinuous footings to maintain natural grade near the base of trees adjacent to the curbing and to minimize injury to roots and root flares.
- “Tyvar BioBarrier” may be used between the curb and tree roots to inhibit root growth that may exploit small cracks in the curb.

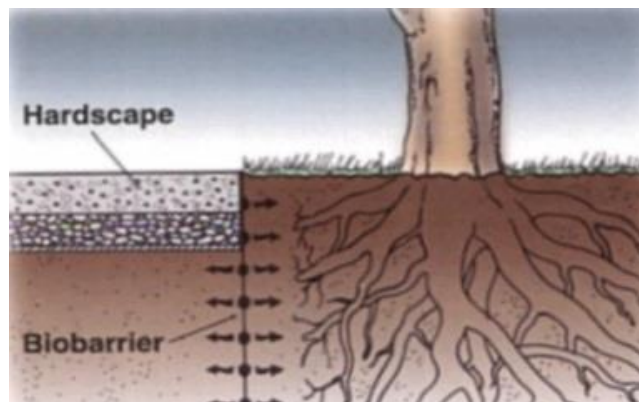


Figure 11 - Biobarrier installation

- Provide for easy concrete removal and replacement where roots may cause sidewalk cracking in the future. This is accomplished by installing an expansion joint on both sides of the root or by etching the concrete on either side of the root to allow that particular section to be broken out and replaced.
- Compaction rating for the replacement walkway should not exceed 80% proctor density. Tree roots will continue to slowly add girth every year; therefore, the base material needs to be malleable (e.g. suitable subgrade aggregates, crushed granite, or compacted sand) to prevent a fulcrum or pressure point that can crack or heave the walkway.
- Where appropriate, and under the direction of the Public Works Department, root-restricting barriers can be installed with a minimal amount of disturbance. These should be linear barriers, not circling barriers. Each situation should be analyzed individually and soil compaction, root space and species should be considered. Landscape related materials may be used as barriers to root growth.

The Community Forest Management Plan is also an essential planning tool for future species selections that will prevent many of the challenges to our current sidewalk infrastructure. Many species that have traditionally been found to have aggressive root growth have been removed

from the street tree palette, such as the Indian Laurel Fig *Ficus microcarpa* and the Shamel Ash *Fraxinus uhdei*.

NPDES/LID Ordinance/Green Streets Policy

As part of an ongoing effort to improve water source reliability as well as watershed quality, the City of Sierra Madre has adopted a Low Impact Development (LID) ordinance and has approved a Green Streets program. The LID ordinance is primarily focused on private property construction and design. The essential function of the ordinance is to retain storm and non-storm water onsite to aid ground water recharge and prevent discharges coming off a property and carrying pollutants to the watershed via the storm drain system. Often, private driveways and walkways will incorporate porous materials to comply with the regulations, and the transition from the new driveways and walkways to the public sidewalks will need attention.

A Green Streets Policy can be likened to a LID effort for public streets and parkways. In order to be consistent with the Green Streets Policy, new sidewalk construction should consider the feasibility of incorporating water-permeable materials at every opportunity.

Municipal Codes

The City of Sierra Madre has a number of municipal codes that regulate the use, construction, and repair of the city's sidewalks. **(Appendix E)** is a compilation of such ordinances that include specific regulations for construction and repair of sidewalks, excavation of public areas including sidewalks, specific requirements for sidewalk dining, and how sidewalks are referenced in the tree preservation ordinance.

At the time this master plan is being compiled, staff is developing possible amendments to the City's grading, low impact development, NPDES, water efficient landscape and water conservation ordinances. Staff is also considering enhancements to the Green Streets Policy. The code amendments and policy enhancements are intended to provide for a more sustainable local water supply through water conservation and groundwater recharge. Some code amendments if adopted, may result in revision to this master plan.

REPAIR TECHNIQUES

The Public Works Department has multiple ways of effecting repairs to damaged sidewalk. The type of repair that is made in each location may vary due to the amount of damage/sidewalk displacement, the condition of the concrete itself, the visible presence of major tree root structure, repair cost, maintenance staff availability, and the determination as to whether the tree causing the damage may be root trimmed or removed. The following repair techniques are used in Sierra Madre.

Temporary Repairs

- **Paint marking.** While not an actual repair, marking the location of a sidewalk defect with a contrasting color of paint serves an important purpose. The painted area of sidewalk calls the passing pedestrian's attention to the damaged area, thereby reducing the likelihood of an accident involving the defect. The paint mark also serves to notify the adjoining property owner and passersby that the defect has been noted by city staff.
- **Concrete grinding.** One means of making temporary repairs is to remove uplifted portions of sidewalk by physically grinding (called cold-planing) the raised area down to make it level with the non-displaced area. This is a form of repair that can be done quickly, efficiently, and at minimal cost. Grinding is typically used when the vertical displacement is an inch or less. This repair can be made without any impact to tree roots. The drawbacks to this repair are that it cannot be done on very old concrete which shatters when hit with the grinding wheel, and the sidewalk surface remaining after grinding is unsightly, grinding cannot be considered a permanent repair in that the cause of the sidewalk defect remains untouched; the sidewalk will continue to be forced upward by root growth, requiring additional follow-up monitoring and repairs.
- **Mortar Ramping.** In some situations Public Works has utilized cement mortar to create a ramping effect at vertical sidewalk displacements. It has also been used to patch potholes in sidewalk. The mortar approximates the look of the underlying concrete for a slightly more attractive repair than the asphalt ramping described below. However, the mortar ramp quickly becomes brittle, and because it inflexible and does not bond well with the underlying concrete, the ramp will break up and be displaced.
- **Asphalt ramping.** The most commonly used form of temporary sidewalk repair in Sierra Madre is the use of asphalt for ramping between displaced sidewalk panels. The asphalt material is easily worked by maintenance staff, relatively inexpensive, flexible, and bonds relatively well with the underlying concrete. However, asphalt ramping is unsightly and draws attention to the defect. Many property owners find asphalt ramping to be objectionable. For that reason, a number of participants in the aforementioned Sidewalk Partnership Program are residents who had asphalt ramping installed in front of their homes.

Long-term Repairs

- **Sidewalk Replacement.** Installation of new replacement sidewalk is often considered to be a permanent sidewalk repair. Often, installation of new replacement sidewalk necessitates the removal of damaging tree roots or sometimes even entire trees. Sidewalk replacement is preferred by adjoining property owners for aesthetic reasons

over other current means of repairs. However, unless the agent which damaged the previous sidewalk is eliminated, even replacement of sidewalk is a temporary repair, as in time the damage will recur. Therefore staff classifies sidewalk replacement, in which the agent which damaged the original sidewalk is eliminated, to be a long-term rather than permanent repair. This classification would apply to any of the replacement materials listed in this document.

Permanent Repairs

- **Sidewalk Replacement with Tree Removal.** As noted elsewhere, while other forces may damage sidewalk, tree roots are the most common cause of sidewalk damage in an urban environment. Focusing then on creating permanent repairs to sidewalks, in order to create a permanent repair, the tree causing the damage must be removed to create an environment which will allow the sidewalk to remain undisturbed. Understanding as well that the Sierra Madre community seeks the preservation of its urban forest, any tree that is removed must be replaced. Rather than simply replacing a mature tree with a new, smaller tree only delays the inevitable root damage to the sidewalk. Therefore any replacement tree must be accompanied by the installation of a root barrier along the nearest edge of the sidewalk for a repair to be considered as permanent.

The Inspection program sets thresholds for sidewalks that have slopes that exceed a 5:1 ratio. Cracks with a width of ½ inch or greater should be filled. Holes of ½ inch depth or greater should also be filled.

Prioritization for future sidewalk installation considerations should align with the goal of this Plan. Specifically, "...continuous improvements towards a safe, accessible, useful, aesthetically pleasing and sustainable system of walkways throughout the city."

Chapter 2 - Data Collection and Inventory

This plan includes an inventory of damaged sidewalk locations throughout the city. The inventory was developed by Public Works field staff walking each sidewalk in the City and noting the location, type, and severity of the sidewalk defect. That inventory is included as **Appendix B** to this plan.

The inventory is comprised of two similar spreadsheets. The first spreadsheet, (List 1), is a list of 329 locations totaling an estimated 11,115 square feet of damaged sidewalk. These locations have not had repairs made, or the temporary repairs previously made in these locations are now in need of replacement. Of that list, 79 locations totaling 2,250 square feet are what staff identifies as high priority repair sites.

The second spreadsheet (List 2) has a slightly shaded background. This is a list of 281 sidewalk damage locations where temporary repairs are current as of 2014. That is, temporary repairs have been made recently enough that these sites do not need any additional repairs at this time. This list addresses 10,350 square feet of damaged sidewalk, including over 100 high priority repair locations.

This plan also includes a series of City Sidewalk Maps (**Appendix F**) that provide a “snap-shot” of where sidewalks currently exist and where they do not. The maps show existing sidewalks in **blue**. It also shows streets that do not have sidewalks in **green**. The areas in **green** indicate that there is current landscaping that extends to the curb. On many streets, this is very consistent, and the addition of a sidewalk along these streets could have a major effect on the look of the street and require the removal of many trees. (See figure 11)



Figure 12 - Landscaped to the curb.

The **green**-outlined streets in the sidewalk maps may also represent a condition in which not only is the property landscaped to the curb, but there are also topographical conditions that would prevent a sidewalk from being installed. Fortunately in Sierra Madre, many of these scenarios exist in cul-de-sacs in the northern portion of town, such as Sierra Meadow Drive and Toyon Road where pedestrian traffic is very low.



Figure 13 - Landscaped to the curb and steep topographical condition.

Finally, a **green**-outlined road may also indicate that there is simply no opportunity to install a sidewalk in the public right-of-way. Virtually the entire Canyon area of Sierra Madre is in green, and figure 13 below clearly demonstrates this condition.



Figure 14- Canyon area, Woodland Drive looking north.

The sidewalk maps also have portions of streets with a **yellow** outline. This third color was needed to show areas that do not have sidewalks, but have either intentional or unintentional footpaths. Figure 14 below shows a footpath that is created when a significant portion of the side of the street has a concrete sidewalk but the sidewalk is not continuous. When the sidewalk ends, pedestrian traffic continues. A concern for this situation is the 4 to 6 inch displacement that commonly occurs when the sidewalk ends. Figure 15 on page 24 illustrates an example of the vertical displacement occurring at the juncture of a concrete sidewalk and an unmaintained parkway.



Figure 15- Unintentional footpath. West Montecito Ave.



Figure 16- Intentional footpath. West Grand View Ave.

An additional benefit of the sidewalk maps is being able to look at sections of the city with a “30,000-foot” perspective. The existence or absence of sidewalks around schools, commercial areas, and other areas with heavy pedestrian traffic can be taken into consideration. What also becomes apparent are anomalies, such as the existence of a single parcel with sidewalk on a block that no other exists. It shows “gaps” in sidewalks between parcels as well.

The second component of data collection and inventory is comprised of the manual inspections of sidewalks that were a part of the Sidewalk Inspection Program. **(Appendix G)** shows an actual copy of field notes that were used to compile the results of the Excel database **(Appendix B)**.

Chapter 3- Prioritization Methodology

As outlined in the Public Works Department Sidewalk Inspection Program, a method for the categorization of field inspections is in place and does not need to be changed at this time. The Inspection program uses four tiers for vertical displacement;

D = displacement of less than $\frac{3}{4}$ inch

C = displacement is between $\frac{3}{4}$ inch and 1 $\frac{1}{4}$ inches

B = displacement is more than 1 $\frac{1}{4}$ inches

A = deficiency is in the vicinity of a sensitive location (i.e adjacent to a school, senior housing, high pedestrian area, etc.) The deficiency rating of A could be given no matter the amount of displacement. It places priority onto the location needing repair due to the pedestrian activity of the site. High pedestrian areas in Sierra Madre have been identified on a map (Appendix H).

Chapter 4 - Action Plan

Specific recommendations of this plan are contained within this chapter. The objectives are bifurcated into two topics; sidewalk maintenance and future sidewalk planning.

Sidewalk Maintenance

The 2012 Sierra Madre Sidewalk Inspection Program is an effective tool for collecting condition and situational data. It is recommended that this program continue to be used, with minor potential improvements listed below.

Objective 1a: It should be the objective of all sidewalk repair considerations to prevent the loss of parkway trees if at all possible. Using alternative designs and materials described in this plan and contained within the Community Forest Management Plan, creative approaches to repair should be sought. This again falls into the absence of a “one-size-fits-all” approach to sidewalk maintenance.

Objective 1b: The Public Works Department should seek to both enhance and simplify records keeping of sidewalk information derived from the Inspection Program. It is possible that future funds could allow the city’s Financial Software or the city’s basic GIS programs to include more sidewalk information to be accessed quickly and accurately. It is recommended that the Public Works administrative support staff work with sidewalk inspectors and their supervisors to seek procedures that would increase the efficiency and accuracy of the record keeping. This objective can be viewed as a “low-hanging fruit” step for improvements.

Objective 1c: It is recommended that the Sidewalk Inspection Program add one element which has not been done consistently. Marking identified defects with white paint (reflective if possible) (See Figure 6 for example) would serve the purpose of short-term identification of a potential hazard as well as preventing the defect from being entered into the database on multiple occasions. This would also assist the staff with customer service by being able to quickly confirm to an inquiring resident with an assurance that the defect has been identified and is queued for repair based on its level of prioritization.

Objective 1d: Safety must continue to be the highest priority for the city’s sidewalks. The city should continue to make any and all repairs to unsafe locations as quickly as possible. This includes the continued use of asphalt patches, which are generally considered to be less aesthetic in appearance, but can be done quickly and are much less expensive in the short time. The city should also continue to identify areas around schools, senior housing, downtown, and other high-pedestrian areas in its prioritization.

Objective 1e: Accessibility must also continue to rank upon the highest of priorities. All projects must conform to ADA regulations and priority should be given to projects that add accessibility to an existing walkway that has issues. One example of such prioritization would be working towards the elimination of driveway approaches that are curbed at the sidewalk and have no

transition for a pedestrian using wheeled transportation. See figure 10; the Sturtevant Drive sidewalk as an example.

Objective 1f: The Sidewalk Partnership Program has been very successful. However, the program is limited to staff resources to complete the installations and repairs. This has been evidenced by long waiting times during the height of the program's popularity. Aside from adding crew personnel, prioritizing the applications by the need for safety, size of the project, and the opportunity to combine similar projects would be more efficient. It is recommended that the Partnership Program be confined to essential repairs, and that the use of the project for the installation of new sidewalks be considered after essential repairs are completed and consistent with the objectives listed below for future sidewalk planning.

Future Sidewalk Planning

Objective 2a: For all future sidewalk installation, as well as projects to remove and replace existing sidewalks, all efforts need to be made to consider the viability of permeable materials. Groundwater recharge and watershed quality efforts have rapidly become major goals in Sierra Madre. However, pedestrian safety and accessibility in the city's sidewalks remain the priority in this Plan, and it is expected that there will be situations in which permeable materials will not be feasible.

Objective 2b: Data analyzed from the sidewalk maps show the need for sidewalk consistency in several areas. It is recommended that the following projects be considered high priority:

2b(1): Install sidewalk on the south side of Esperanza Ave. Approximately 40% of the south side of the street currently has a concrete sidewalk. A project should be considered to complete the sidewalk as this location is a direct link from senior housing to and from the Hart Park House Senior Center.

2b(2): Install sidewalk to fill in the gaps at the 600-700 block of West Montecito Ave. and the 100 and 200 block of West Montecito Ave. In viewing Sidewalk Map 2, (Map 4 for 100 block) it is apparent that this would be one of the first projects that should be considered. This street should be highly prioritized as it is a peripheral conduit of pedestrian traffic between West Sierra Madre Blvd., and West Highland Ave., both of which are considered to be high-priority zones with schools, churches, commercial and governmental uses. West Montecito Ave. also has unintended footpaths that link the islands of existing sidewalk. Consider the viability of installing alternative to concrete porous sidewalks at these locations.

2b(3): Install sidewalk at existing unintentional footpaths on the 100 block of Olive Drive, and the southern portion of the 100 block of West Alegria Ave. This location is directly adjacent to St. Ritas School. It is also the main location for drop-off and pick-up of students. According to Sidewalk Map 3, there are green highlights on the street west of the school area that may not be available for new sidewalk installation, but the sidewalk areas should be addressed.

2b(4): Install sidewalk to fill in the gaps on the south side of 100/200 block of E. Grand View Ave. At the very top of Sidewalk Map 4, it is apparent that between 80 and 158 E. Grand View Ave., there exists an unintentional footpath, with one island of sidewalk at 138. This is also a school route for St. Ritas students.

2b(5): Sidewalk installation for consistency should also be considered, but at a lower priority for the following locations:

320, 306 W. Highland Ave.
217 W. Montecito Ave. (Hermosa frontage)
269 W. Laurel Ave.
67 E. Highland Ave.

2b(6): Constructed DG sidewalks, or other permeable alternatives should be installed at many locations along W. Grand View Ave. Sidewalk Map 1 shows unintentional pathways starting at N. Sunnyside Ave and extending east towards Adams Street. The condition continues to N. Baldwin Ave. on Sidewalk Map 3. This is on the north side of the street only, as a concrete sidewalk exists along the south side of the street. This pathway currently has aesthetic value and is shaded by a number of mature Oak trees. The pathways are well traveled and in good shape. It is recommended that the pathways be refurbished with new DG and side barriers where needed to keep this porous and uniquely pleasant walkway.

2b(7): Constructed DG sidewalks, or other permeable alternatives should be installed at the south side of 500/600 E. Grand View Ave. This is adjacent to the northern portion of the city's spreading grounds. Recent improvements have been made to the landscaping along this corridor and while this is not a heavily traveled pedestrian area, it is very suitable (and located appropriately) for walkways that include the benefit of groundwater recharge and watershed quality protection. This would also be an appropriate location to test new permeable materials that may be used for future installation.

2b(8): There should be areas formally designated for not having a planned future sidewalk installation. These zones should be available for any person that would like to inquire about sidewalks in their neighborhood. The City Sidewalk Maps have identified a number of these areas. The majority of the canyon neighborhoods should be formally identified as no planned future sidewalks as it would not be feasible. Other private property-parkway-street interactions are locations that should be formally identified as not planned future sidewalk locations, due to topography or other occurrences. The maps have identified a number of non-through streets such as cul-de-sacs where pedestrian traffic is typically very low, and should also be considered in this effort.

Sidewalk Replacement Options

The following discussion of sidewalk replacement options is paraphrased from “Sidewalk and Roots: Mitigating the Conflict – An Overview” by consulting Arborist Gordon Mann. Used by permission of author.

“In mitigating sidewalk-tree root conflicts, the decision to retain the tree will either be tree removal avoidance or tree preservation. The tree removal avoidance approach focuses on the repair process and does some damage to the tree. The intent is to maintain the tree stability and avoid unplanned tree failure. Tree decline or death of the tree, although not desirable, can be managed. Tree removal avoidance typically involves root pruning and soil grading – typically, cutting roots more severely than accepted standards in lieu of tree removal. The tree may often decline or shed branches in response to the root loss.

The tree preservation approach focuses on protecting the tree for maintaining its health, condition, and longevity. The intent is to avoid injury or decline to the tree, and avoid damage to the site that can cause decline or injury to the tree. An example of tree preservation is relocating the sidewalk and minimizing excavation into the root area while completing the repair. Tree preservation also includes trenching around roots and avoiding soil compaction.

The choice of sidewalk material is a major consideration in retrofitting and designing sidewalks adjacent to trees. The disadvantage of rigid material such as concrete is that one lift point pries and raises an entire section, causing the section to be cantilevered and offset. This can create an edge step separation greater than the actual root lift. Alternatives to concrete offer the benefits of less excavation, reduced root pruning, increased porosity (such as “Green Streets”), and the ability to allow roots to exist in the base material.

The disadvantage with materials that require an edge border for support is that the rigid edge border can be raised by root action and cantilevered in a fashion similar to concrete. Edge borders include the footings on the tree grates and side forms on brick, interlocking pavers, decomposed granite, gravel, and rubber panels.

Re-usable sidewalk materials offer the ability to repair future damage and re-use of the same materials. This reduces the future material costs during subsequent repairs or maintenance. Additionally, from a sustainability perspective, there may be less material going to the landfill. Another advantage of re-usable materials is that site appearance remains more consistent over time.”

In practice, Sierra Madre staff have always taken the proximity of tree trunks, trunk flare and roots into consideration when determining the best method to repair or replace a sidewalk. In the majority of cases, the city’s contract Arborist will accompany staff to the site and provide an opinion on whether the tree has a good chance to survive a certain amount of root pruning, or if the tree should be removed as it would be rendered instable. The Arborist, as well as staff, must make judgment decisions based on the size and quantity of roots that would be affected. Since some roots are visible and can provide a good indication of what would be found under the soil, the estimates have been fairly accurate. However, there are occasions where unanticipated

roots are discovered during the trenching. When this occurs, staff will need to make a judgment call, with the assistance of the arborist if possible, and determine if the tree should be entirely removed or the project moves forward and the tree would have to be watched for a period of time.

Staff, with or without the contract Arborist, may also take into consideration the future appropriateness of the tree in question. Is it the “right tree in the right place”, or will it continue to grow and expand in its location? Is the tree in poor health or reaching the end of its typical life-cycle? Additional extenuating factors are considered with the goal of avoiding costly repairs to a section of sidewalk, only to have to return in a few years to re-address the sidewalk or the tree itself.

This Plan recommends that the current practice of reviewing tree/new sidewalk interaction as stated above continues. Public Works staff has attained the experience, and the city’s contract arborist has changed only once in the past 10 years. Estimations and opinions have very rarely been incorrect on “close calls”. When this occurs, it is recommended that staff continue to err on the side of safety and, in most cases, remove the tree.

Sidewalk Construction or Replacement Materials

The following discussion of sidewalk construction or replacement materials is intended to cover a wide range of possibilities. This Plan covers, as much as possible, the latest technology and trends. Staff will continue to watch for new approaches and new ideas in the industry and incorporate them into the plan when desirable.

Concrete – The advantage of using concrete is that this accepted standard material is solid, doesn’t need an edge treatment, and can be permeable, reinforced, tinted, textured, and shaped and formed into curves around trees. It also can be leveled by slab jacking settled areas and grinding raised edges. The drawback of concrete is that it is rigid and not reusable, is usually not permeable, and depending on soil conditions and building codes may require a 4-inch-thick compacted base beneath 4-inch-thick sections. Roots are not allowed in the base material. This often means removal of roots, impacting tree health and stability.



Figure 17 - Concrete installation

Asphalt – The advantage of using asphalt is that it is low in cost, thinner than concrete, and easily paved, shaped, and repaired. It should not need an edge form to remain in place after paving. It can be coated with a cement dust that absorbs oils and helps the surface color to be grayer, reducing heat absorption. It can also be stamped and coated with color. Asphalt doesn't require a thick base when used for a walking surface. It can be placed over roots and can be permeable. The roots can remain in the base material as long as they do not contact the asphalt layer. Future repairs may only require sawcutting the failed smaller area around the root and patching with more asphalt. Additionally, asphalt can be used as a ramping or topping (skin patching) material to alleviate a raised/offset concrete area. A drawback is that asphalt can heat up in the sun and become soft, it has a shorter lifespan than concrete, it is not reusable, and its appearance is not always desirable.



Figure 18 - Asphalt sidewalk and parkway

Tree Grates - Tree grates provide space around the tree as long as the grate opening doesn't cut into the trunk or trunk flare as the trees grow larger in girth. The opening can be enlarged by cutting the grate material but many cities fail to keep up with this requirement. Additionally, cutting the steel can rarely be completed on site. The grates offer permeability. On the downside, the grates must sit in a concrete footing. If the grate is 4 or 5 feet square, the space between the footing and trunk and roots is inadequate, and the grate frame is the first object to be lifted. Grates and installation are one of the most expensive treatments. If larger grates are used, 6' square, or 6' X 8' or 10', the soil area between the tree and the concrete frame footing may be adequate for long term growth, although larger grates are more expensive.



Figure 19 - Tree grate.

Bricks over Sand – The advantage of considering bricks include the fact that they are a common material, mid-range in cost, and have many colors. They can be placed over roots, shaped or curved, and are reusable. Bricks are considered more attractive than some treatments. There is permeability in the seams between the bricks. On the minus side, bricks require a rigid side form (wood or concrete), which can be lifted and cantilevered by roots. Bricks don't interlock, so individual bricks can be offset and not level. It is mid-range on the thickness scale.



Figure 20 - Brick sidewalk.

Interlocking Pavers – There are positive aspects of this material for new sidewalks. Pavers are flexible, reusable, shape-able, and decorative, and typically installed on a sand base that can be placed over roots. Pavers have permeability in the seams between the pavers. A disadvantage is that they need a concrete or rigid edge band on all sides to hold them in place and this band can be lifted by tree roots. They are mid to upper level on the thickness scale. Also, interlocking pavers usually require higher maintenance to keep them looking attractive and to ensure that the permeability of the pavers remains.



Figure 21 - Interlocking pavers.

Decomposed Granite, aka Fine Rock Dust -This material is low cost and maintained by adding more or by re-grading. A binder can be used to help keep it together. Its border can be shaped, it can be laid over roots, and it doesn't need a deep base that can be placed over roots. On the

minus side, it requires an edge band on the sides to hold it in place, and this band can be lifted by roots. Also, the surface needs more maintenance and it has the potential for dust to be tracked into homes and businesses. It can erode on slopes and therefore should not be utilized on north-south running streets. The appearance may not be acceptable in some urban settings. This is mid to upper level on the thickness scale and once compacted or treated with a stabilizer to keep it from turning into mud when wet, is less porous.



Figure 22 - "DG" walkway.

Rubber Panels – The advantages of using rubber panels is that they are made from recycled materials and are flexible, thin (around 2 inches), and re-usable. They can be cut to shape around trees and can be placed directly over roots. The base material can be filled in around roots and graded prior to laying the rubber panels. The panels have permeability in the seams between the panels. Also, rubber panels can be manufactured to have different finish appearances. The drawback of rubber panels is that an edge treatment is needed and if the final grade undulates (as in rolling hills), its edges may not match perfectly. Another disadvantage is that most installations are not designed for vehicle traffic. This material is on the lower end of the thickness scale.



Figure 23 - Rubber panels.

Plastic Panels – On the plus side, the plastic panels are made from recycled materials. They have some flexibility, thin (around 2 inches), and re-usable. They can be cut to shape around trees and can be placed directly over roots. The base material can be filled in around roots and graded prior to laying the plastic panels. The panels have permeability in the seams between the panels. Also, plastic panels can be manufactured to have different finish appearances. The panels stake directly to the ground and do not require edge treatments. On the minus side, the panels expand and need to have accurate spacing between panels. The panels don't dowel into adjacent concrete.



Figure 24 - Plastic panels.

Poured-in-Place Rubber – Forms for this material may be removed after the product cures and it can be poured over roots. Other advantages are that it can be shaped or curved, can be placed in thinner sections (2 inch), it doesn't need a thick base, and can the top surface can be colored for enhanced appearance. Disadvantages are that it is not reusable, it is softer/more squishy than formed rubber panels/pavers, and its cost or contractor availability varies greatly by location. Another disadvantage is that most installations are not designed for vehicle traffic. This material is on the lower end of the thickness scale.



Figure 25 - Poured-in-place rubber.

Aggregate walkways - such as *Nidagravel*, have gravel set in cells over a base material. It can be used for porous walkways and drives. Many different styles of aggregate can be used. Although the materials may be re-movable, they are on 4' X 8' cells and the sheets are overlapped making maintenance challenging. The gravel is placed about 1 inch above the cells, and they must have a raised edge (recommendation of up to 1") to hold the gravel on top of the cells in place. There is no binder, but the aggregate is supported in the cells and is supposed to be stable, only requiring minimal maintenance.

Polymer-Bonded Aggregate - This relatively new material consists of small aggregates of decorative stone that are glued together with a very viscous polymer which forms a bonded, porous walking surface. It doesn't need rigid side forms or a thick base. It can be shaped or curved and placed over roots. The forms are removed after the polymer cures. On the minus side, it is rigid—but repairs can be made by sawcutting and patching aggregate. As a material, it hasn't

been on the market long enough for long-term evaluation. This material is on the lower end of the thickness scale, although if designed for vehicle traffic, it may be thicker.



Figure 26 - Aggregate material close-up.

Root Bridging - The approach shown below creates a space between the sidewalk material and the existing tree roots while still meeting ADA standards. A slope is created using posts, piers, or arch supports; the sidewalk material is laid on the supports to leave a gap and space for the roots to grow without lifting the sidewalk. The big advantage of root bridging is that existing roots can be retained for health and stability. The bridging materials can vary, depending on height required, length of the repair area, and available budget. Common materials are wood, concrete, and composites. The main disadvantage of root bridging is that its design and construction is expensive. If the height of the bridge is equal to a step (6 - 8 inches) above the side grade, a railing may be necessary for safety. Sometimes soil can be used to match the edge of the bridge and remove the step-off potential.



Figure 27 - Root-bridging construction.

Sunnyvale’s Steel Plates - An innovative method practiced for more than 15 years in Sunnyvale, California is to use steel plates to limit the future growth of the root towards the concrete improvement. Steel plates of 1/8” thickness are bolted on top of the root or placed on opposite sides of the root and bolted together, sandwiching the root. Future root growth cannot push the steel apart—rather, the root flattens between the plates. Plates are placed under or adjacent to the sidewalk to strategically limit future radial growth. This technique is more expensive than root pruning and it takes time to perform the plate work. However, Sunnyvale has not had to return to these sites for root conflicts and the trees are more stable than if they were root pruned.

Sidewalk Replacement Cost Comparison

Table A

Sidewalk Mat'l	Material (psf)	Installation (psf)	Total (psf)	Inst. By Staff?
Asphalt (Std)	\$2.22	\$29.00	\$31.22	Yes
Asphalt (Porous)	\$2.13	\$29.00	\$31.13	Yes
Concrete (Std)	\$1.75	\$29.00	\$30.75	Yes
Concrete (Porous)	\$1.75	\$29.00	\$30.75	Yes
Brick Over Sand	\$2.58	\$48.35	\$50.93	Yes
Interlocking Pavers	\$2.58	\$48.35	\$50.93	Yes

Sidewalk Mat'l	Material (psf)	Installation (psf)	Total (psf)	Inst. By Staff?
Decomposed Granite	\$1.85	\$29.00	\$30.85	Yes
Rubber Panels	\$10.00 material and installation		\$10.00	No
Plastic panels	\$10.00 material and installation		\$10.00	No
Poured in Place Rubber	Acquire quotes for specific project			No
Aggregate Walkways	\$1.60	\$48.35	\$49.95	Yes
Polymer-Bonded Aggregate	Acquire quotes for specific project			No
Root Bridging	\$2.00	\$48.35	\$58.35	Yes

Additional Costs

Table B

Description	Average Cost	By Staff?
Tree Removal & Stump grinding	\$865	No
Tree Planting (15 gallon) w/ Root Barrier	\$175	No
Temporary repair-Grinding	\$10.73 psf	Yes
Temporary repair-Ramping	\$9.43 psf	Yes
Tree Grates	\$350.00 ea	Yes
Root Barrier	\$5.40 psf	Yes

Funding Sources

There are multiple means of funding sidewalk installation and repairs. In the past, the City has utilized primarily General Fund, the Sidewalk Partnership Program, CDBG Funds, and Transportation Development Act (TDA) funds. Sidewalk repairs are typically done as individual projects, but may also be included in general street resurfacing projects if the street project funding allows. Inasmuch as from time to time general funds have been approved for supplementing other street-funding sources, in those cases general funds have been used for sidewalk repairs.

The following funding source descriptions are based on the adopted 2014-15 budget. Thus, the funding amounts may be expected to change from year to year.

Sidewalk Partnership Program

On March 9, 2010, the City Council unanimously approved the Sidewalk Partnership Pilot Program. The program, in which the city pays for the labor and the material costs are borne by the adjoining property owner has increased the scope of the city's annual replacement program. The program has been very successful. Since its inception, the Public Works Department has repaired sidewalk sections at 47 locations and currently have 4 additional applications in process. The total amount contributed by the residents in conjunction with this program is \$24,393.85.

The cost of materials is quoted to the resident before they approve the project to continue. This material cost will vary slightly during the year. Currently, the price used for the quote is \$3.00 per square foot.

Staff has also estimated the city's in-kind labor that is supplied with this program. Approximately 72 man hours are required to remove and replace 100 linear feet of sidewalk.

This effective program comes with certain limitations. On a few occasions since the 2010 launch of the program, applications have been received at a pace that overwhelmed the Public Works Crew's resources. Delays in completed projects have inconvenienced a few residents, yet the overall project has consistently remained popular and appreciated by the resident participants.

Community Development Block Grant (CDBG) Funds

The use of federal CDBG funding is strictly regulated by the Los Angeles County Community Development Commission. One of the few uses available to the city for CDBG funding is that of removal of barriers to access for disabled persons. Thus, the creation of new sidewalk meeting ADA standards is an acceptable use of CDBG funding.

Transportation Development Act (TDA)

The city receives \$5,000 each year in TDA funds. Those funds, less \$500 in Internal Services cost allocations have typically been budgeted to purchase sidewalk maintenance materials.

Gas Tax (2105, 2106, 2107)

According to State Controller guidelines, Gas Tax funding may be utilized for maintenance of any roadway improvements, including sidewalks. These funds are committed annually to street maintenance personnel costs, street sweeping, street lighting, Internal Services cost allocations, and street maintenance capital improvement projects. Typically, the amount of Gas Tax available for street improvement projects is the amount of funds available after the set costs (personnel, electricity, street sweeping, etc.) are determined. The budgeted amount of Gas Tax available for capital improvements in FY 2014-15 is \$73,024. Any portion of that \$73 thousand set aside for sidewalk work would reduce the repairs to roadway pavement accordingly.

Measure R

Measure R is a primary source of funding for street maintenance in Sierra Madre. The majority of the funding for the FY 2014-15 street improvement project is taken from Measure R funding, in the amount of \$745,586. The City receives approximately \$116,000 per year in Measure R funding. As noted above, any portion of that \$116 thousand set aside for sidewalk work would reduce the repairs to roadway pavement accordingly.

New Development

It is common in California to require new development to construct sidewalk as part of the development's infrastructure. This has been done most recently in Sierra Madre with the

requirement that the One Carter developer install sidewalk, and with the Sierra Place/Sierra Madre Boulevard and Kensington developers to replace damaged sidewalk.

California Streets and Highways Code

The California Streets and Highways Code Section 5610-5618 (**Appendix D**) and the survey of California Cities that require land-owners to be responsible for sidewalk maintenance (**Appendix C**), are attached to this report. In short, Sections 5610-5618 allow for a local agency to shift the responsibility for sidewalk maintenance to the adjoining private property owner. Of the 45 cities responding to staff's survey, 24 required homeowner participation. Of the participating-homeowner subset, three exempted the homeowner when the sidewalk damage was due to a parkway tree, and four split the cost with the homeowner 50/50. One city has established an assessment district to fund sidewalk maintenance.

Sierra Madre's policy-makers may consider whether such a shift would be appropriate. Moving the maintenance responsibility to the residents would be a major change in policy and would need legal review, discussions with the city's insurers, public input and would constitute a sea-change in the way the city has historically approached service to the community.

Recommendations

This Plan recommends that Public Works staff seek opportunities to test alternative sidewalk installation or repair methods whenever possible. This should always be a consideration when looking at a site, with the understanding that there is no “one-size-fits-all” method of construction or materials.

However, while alternative methods of repair or installation of sidewalk are preferred from an aesthetic and environmental perspective, community limitations, such as lack of funding or a desire to preserve mature parkway or private trees may effectively prevent the widespread use of alternative methods.

Regardless of the method of repair of sidewalks, public safety must be the highest priority. Therefore, sidewalk repairs must proceed as quickly and efficiently as possible. Staff recommends that the following process be followed for the repair and ongoing maintenance of the city’s sidewalks.

Priority 1 – First steps

As the identified highest priority/highest pedestrian traffic areas in the community, the Areas with a location rating of ‘A’ shall be corrected first. The inspection report identifies 79 locations totaling 2,250 square feet in the A-rated areas.

1. Damage rating B locations will be corrected with asphalt ramping. Estimated cost \$5,200 with the commitment of 136 manhours of Public Works in-house staff to make the repairs.
2. Damage rating C locations will be corrected with asphalt ramping, or if possible with grinding. The estimated cost of this repair work is \$7,000 and will require a commitment of 180 manhours of Public Works in-house staff to make the repairs.
3. Damage rating D areas will be corrected by concrete grinding. The cost is estimated at \$10,290 and this repair will involve 290 manhours of staff time. Although slightly more costly than asphalt patching, this repair is slightly more attractive and is more durable than the thin layers of asphalt that would be used to ramp this smaller deflection.

It is a Public Works Department goal to complete the repairs to the A-rated areas by the conclusion of FY 2015-16. Once these repairs are completed, the remaining repairs will be addressed on a street-by-street basis as quickly as funding and staffing levels allow.

Priority 2 – Ongoing Maintenance

As trees continue to grow, so do the resulting sidewalk displacements. A critical part of sidewalk maintenance is the maintenance of the sidewalk inventory. To that end, Public Works will update the inventory on an annual basis. The update will consist of the entry of the dates of each repair made, as well as a city-wide sidewalk inspection. Volunteer assistance will be sought for inspection purposes.

Priority 3 – Sidewalk replacement

1. It is anticipated that some of the temporary repairs noted above will result in property owners seeking to participate in the cost of sidewalk replacement. To the degree that sidewalk replacement can be done without significant damage to trees or outright tree removal the Sidewalk Partnership Program will provide for sidewalk replacements.
2. As the green streets program is developed by staff and added to this master plan, it is reasonable to expect that parkway green street improvements may include replacement of sidewalk with more porous materials.

Priority 4 – New Sidewalk Installation

1. This Plan describes numerous locations where the installation of new sidewalk would be of benefit to the community. However, due to funding constraints and staff experience with homeowner reluctance to have their landscaping torn up for sidewalk installation, a proactive sidewalk installation program is not proposed under this Plan.
2. Nevertheless, new sidewalk could be installed if requested by individual homeowners under the ongoing Sidewalk Partnership Program. New sections of sidewalk that will fill in gaps in the existing sidewalk system will be given priority in scheduling work.
3. Larger sections of new sidewalk could be installed under neighborhood participation in the Partnership program.

Performance Measures

Measure	FY 2011-12 (Actual)	FY 2012-13 (Actual)	FY 2013-14 (Actual)	FY2014-15 (Projected)	FY 2015-16 (Goal)
Replace damaged Sidewalk	12,500 SF	LF	LF	LF	LF
Spot or Temporary Repairs	EA	EA	EA	EA	79 EA

Chapter 5 – Green Streets Program

This section left Blank. The Green Streets program is currently under development and will be inserted here in the Master Plan when completed.

Conclusion

Innovative methods of administering a sidewalk repair program are needed to achieve longer living trees and fewer conflicts. The approaches will require a good education component to receive better engineer and property owner acceptance.

If Sierra Madre continues to design the sidewalk-tree interfaces the same as done in the past, the city will see the same sidewalk-tree root conflicts. Fortunately, there are options for the city to consider and achieve a higher level of success in protecting its tree infrastructure assets while enjoying pedestrian walkways. As Sierra Madre strives to create walkable, sustainable, shaded neighborhoods, staff will need to work with community designers, civil engineers, landscape architects, and planners to modify current practices and adopt approaches that have a higher probability of long-term success.